83/73

3669/44

BRITISH

83/73

360,149 COMPLETE SPECIFICATION

2 SHEETS
SHEET 1

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1

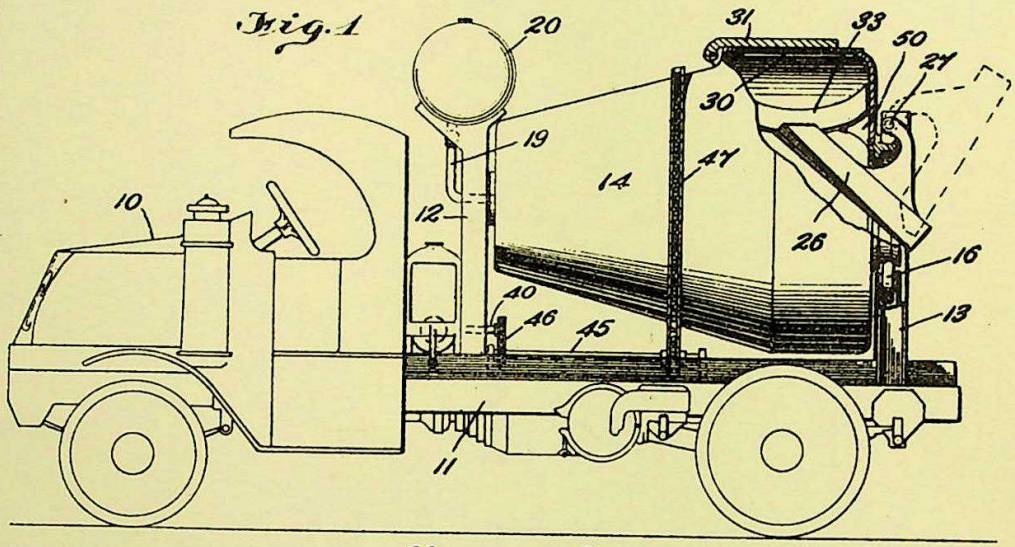
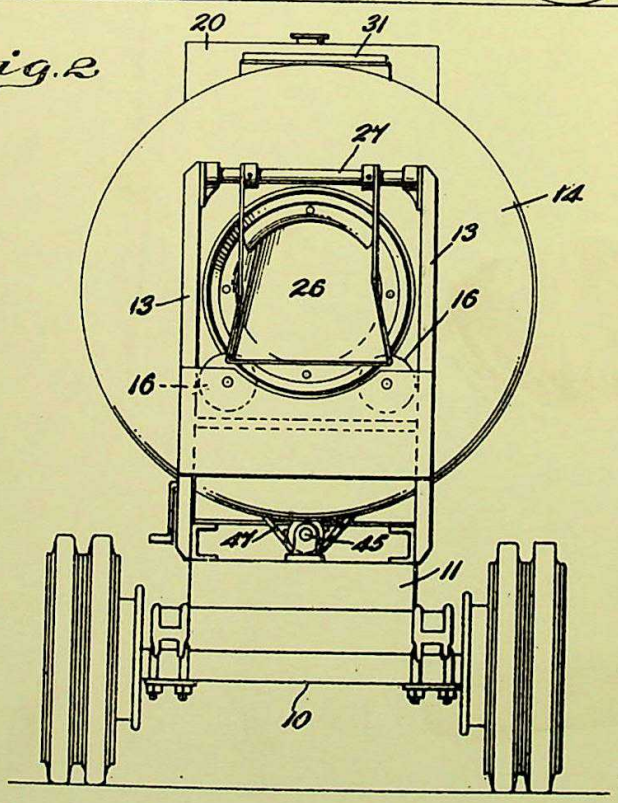


Fig. 2



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360,149 COMPLETE SPECIFICATION

Fig. 3

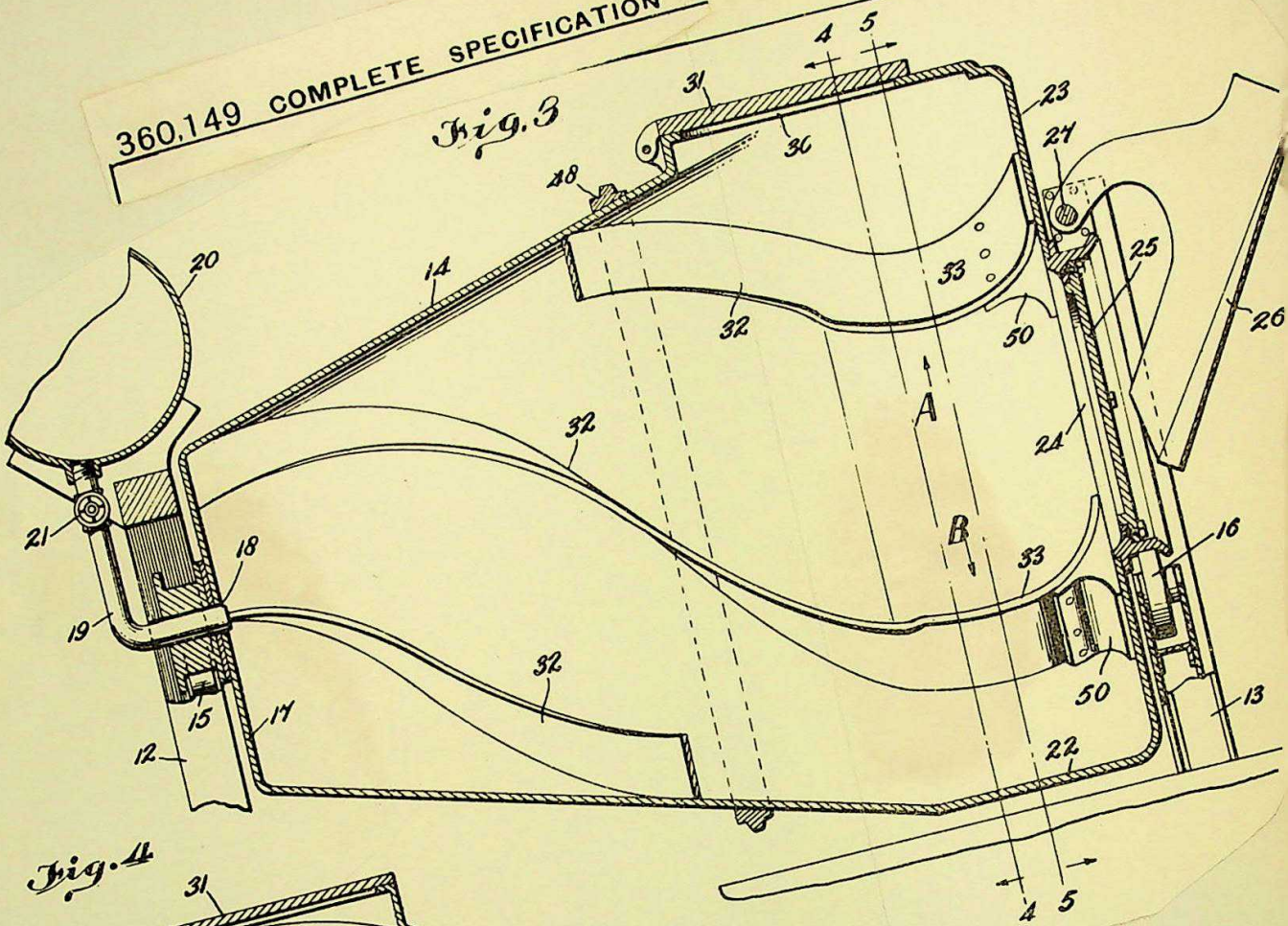

Fig. 4

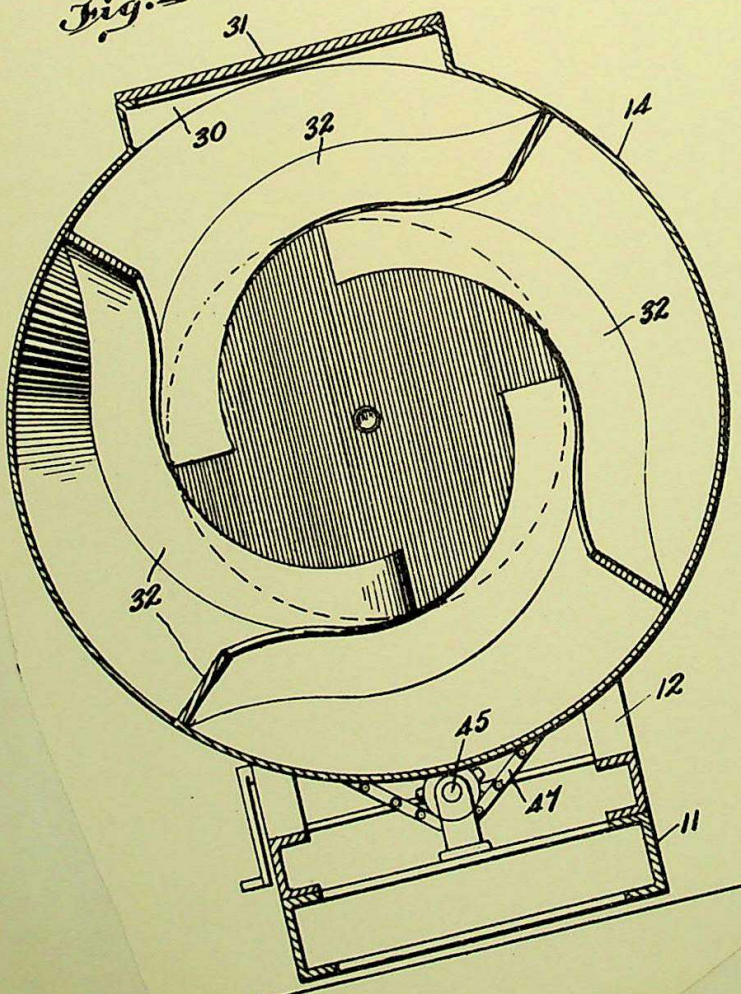

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Fig. 5

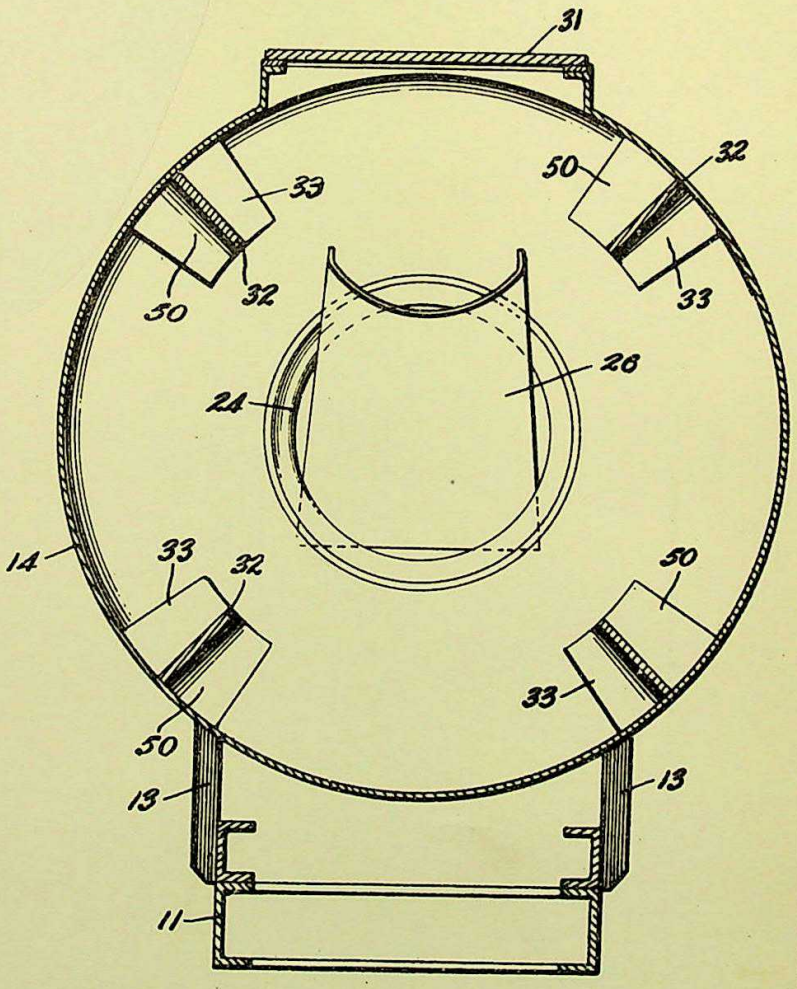
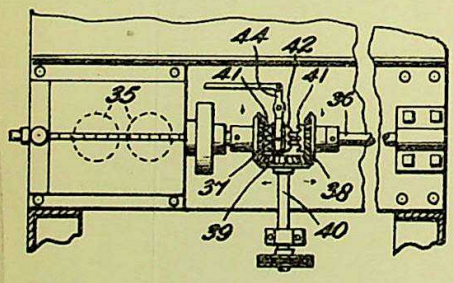


Fig. 6



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PATENT SPECIFICATION

Application Date: Oct. 4, 1930. No. 29,747/30.

360,149

Complete Accepted: Nov. 5, 1931.

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Div. ... 2 ...

COMPLETE SPECIFICATION.

Improvements in Concrete Mixers and Agitators.

I, CHARLES FIELD BALL, of 736, Park Street, Milwaukee, Wisconsin, United States of America, a citizen of the United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in concrete mixers or agitators and is more particularly but not exclusively concerned with those mixers which are mounted upon a vehicle so that the mixing or agitation of the products to be mixed may take place during transportation from a central source of supply to the point of use.

The primary aim of the present invention is to provide a concrete mixer or agitator of an improved and simplified nature and by means of which a very complete mixing of the constituents is obtained, this being secured in accordance with the present invention by providing means which simultaneously subject the constituents to the action of moving blades or vanes as well as to an end to end movement within the mixing receptacle.

In accordance with the present invention a concrete mixer is provided comprising a rotatable receptacle closed at one end and having an aperture at the other end serving for discharging purposes and blades arranged to lift portions of the mass being mixed and deliver same onto an inclined surface which directs the mass towards the aperture in the receptacle from which it is again lifted by the action of the blades.

In order to enable the invention to be more fully understood reference is made to the accompanying drawings illustrating by way of example one embodiment of the invention.

Fig. 1 is a side elevational view partly broken away of a concrete mixer or agitator constructed in accordance with the present invention.

Fig. 2 is an enlarged end elevational view of the parts shown in Fig. 1 as seen from the right of the said figure.

Fig. 3 is an enlarged vertical, longitudinal sectional view through the mixing receptacle.

Fig. 4 is a transverse sectional view taken approximately on the plane indicated by the line 4—4 of Fig. 3 looking in the direction of the arrows.

Fig. 5 is a similar view taken approximately on the line indicated by the line 5—5 of Fig. 3 looking in the direction of the arrows; and

Fig. 6 is a fragmentary detail plan view illustrating one means of supplying power to the mixer.

While the principles embodied in the invention are susceptible of wide use in the mixing of materials, for the purpose of illustration and description the invention has been shown in the form of a transit mixer, that is, one in which the mixing or agitating receptacle is mounted upon the chassis of the motor truck or other similar vehicle so that the mixing or agitation may take place during the transportation of the concrete materials from a central source of supply to the point of use.

In the said drawings 10 indicates generally a motor truck or other similar vehicle having a chassis frame 11 upon which there is provided front and rear upright members 12 and 13 respectively. A mixing or agitating receptacle 14 is mounted upon the truck, the forward end of the said receptacle being suitably journaled upon rollers 15 in the forward support 12 while the rear end of the said receptacle is journaled upon rollers 16 suitably supported by the rear uprights 13.

As clearly shown in Figures 1 and 3 the receptacle 14 is of a substantially frusto-conical shape with its larger end located toward the rear of the truck and its smaller end toward the front. The said smaller end is completely closed by a wall 17 except for a small opening 18 through which passes a pipe 19 leading from a water tank 20, the said pipe 19 being controlled by a suitable valve 21 all as is clearly shown in Figures 1 and 3.

The rearward end of the receptacle 14 may be formed with a short cylindrical portion 22 and the rear wall 23 of the said receptacle is provided with a centrally

located opening 24 through which the receptacle may be charged and discharged. This rearward opening 24 is normally closed during transit or during the mixing operation by any suitable closure 25 which may be readily removed for charging and discharging. A discharge chute 26 which may be similar to those commonly employed upon mixing apparatuses of this character is pivotally mounted at 27 upon the upright members 13 and is adapted to be swung from the full line position shown in Figure 1 to the dotted line position shown therein by any suitable means not shown. The said receptacle 14 may also be provided, if desired with a hatch opening 30 in its side wall through which material may be introduced if desired instead of through the rear opening 24. The said opening 30 is closed by a hatch cover 31 which may be secured in position by any suitable means not shown.

Upon the inner surface of the frusto-conical receptacle there is provided in the well known manner a plurality of vanes or blades 32 which are spirally arranged around the inner circumference of the drum. The pitch of the spiral is relatively high so that the said blades will not only act to advance the material longitudinally of the drum when the latter is rotated but they will also serve to lift the material upwardly in the manner commonly employed in concrete mixers of the rotating drum type and deposit it back toward the center of the drum as the said blades progress in their travel. That is to say by giving the spiral a relatively high pitch the blades assume a substantially horizontal position to lift the material upwardly and then discharge it back towards the bottom of the drum as their rotation proceeds. At the same time owing to the spiral arrangement there is more or less of an endwise movement imparted to the material so that the blades perform a combined mixing action and endwise movement of the material.

The direction of such endwise movement of course depends upon the direction in which the drum and blades are rotated since if this rotation be in one direction the material will be moved from the large end to the small end of the drum while if the direction of rotation be reversed the material will be moved from the small toward the large end of the drum. In the present instance it is contemplated that the rotation of the drum during the mixing period will be that indicated by the arrow B in Fig. 3 so as to move the material from the large end toward the small end of the frusto-conical drum and were the drum truly cylindrical this would result in all of the material accumulating in the forward end where it would be merely revolved around continuously without any particular mixing action. However, by making the drum in the form of the frustum of a cone, as the material is advanced toward the smaller end, it will under the influence of gravity be returned down the sloping surface of the drum toward the larger end, as will be readily understood from reference to Fig. 3, thereby securing not only a mixing action by the blades 32 but also a continuous end to end movement of the material which accomplishes a much more complete mixing of the constituents than would be possible in a cylindrical drum.

For the purpose of discharging the material from the drum at the completion of the mixing period the direction of rotation of the drum is, in known manner reversed so that the blades 32 act to assist in returning the material from the smaller end to the larger end. The end portions of the blades at the said larger end are preferably enlarged somewhat and are curved as clearly shown in the drawings to provide what may be termed buckets 33 which lift the mixing material upwardly during this reverse rotation and drop it into the discharge chute 26 when the latter is in the full line position shown in Figure 1.

The mixing receptacle may be rotated in any desired manner, as for example by means of a suitable power take-off from the truck motor, or as is here illustrated, by means of an independent motor 35 mounted on the truck chassis behind the cab. The power shaft 36 of the said motor may be provided with any suitable reversing mechanism whereby the direction of rotation of the receptacle 14 may be controlled. The form here shown comprises a pair of bevel gears 37 and 38 loosely mounted upon the said shaft 36 and meshing with a companion gear 39 carried by a longitudinally extending jack shaft 40. The gears 36 and 38 are provided with suitable clutch elements 41 which are adapted to be engaged at will by companion clutch elements 42 splined to the shaft 36 and shiftable into and out of engagement with the respective element 41 by means of a suitable control lever 44, all as will be readily understood from Fig. 6. The jack shaft 40 drives a countershaft 45 by means of a sprocket chain 46 and the power is transmitted from the said shaft 45 to the drum 14 by means of a spocket chain 47 which engages a sprocket 48 carried by the said drum all as is customary in this type of apparatus.

As above stated the end portions of the blades 32 are curved at the larger end of the drum to provide discharging buckets

and the extreme ends of the said blades, of course, meet the end wall 23 of the drum substantially at a tangent. This forms a V-shaped pocket in back of the blades in which concrete material is apt to collect and in order to prevent this, filler pieces 50 are preferably secured to the blades 32 and to the end wall to exclude the concrete material therefrom.

The present invention is adapted for use either as a mixer or a transit agitator. That is to say the raw material comprising cement, sand, gravel and water may be introduced into the drum and the latter rotated for suitable periods during transit to mix the said materials into concrete, or the concrete may be mixed at a central plant and be introduced into the drum for transportation to the point of use during which time the drum is rotated to agitate the mixed concrete and prevent the settling of the heaver constituents. In either event the drum is rotated during transit in the direction indicated by the arrow B (Fig. 3) whereby the above described mixing and endwise movement of the material is accomplished through the action of the spiral blades 32; and when the truck has reached the point of use and it is desired to discharge the concrete the direction of rotation of the drum is reversed to that indicated by the arrow A (Fig. 3) so that the mixed concrete will be returned to the larger end of the drum and there lifted by the bucket portions 33 of the blades and dumped into the discharge chute 26 as will be readily understood.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A concrete mixer or agitator comprising a rotatable receptacle closed at one end and having an aperture at the other end serving for discharging purposes and blades arranged to lift portions of the mass being mixed and deliver same onto an inclined surface which directs the mass towards the aperture in the receptacle from which it is again lifted by the action of the blades.

2. A concrete mixer or agitator comprising a rotatable receptacle closed at one end and having an aperture at the other end serving for discharging purposes, an aperture in the side of cylindrical wall of the receptacle for charging purposes and blades arranged to lift portions of the mass being mixed and deliver same onto an inclined surface which directs the mass towards the aperture in the receptacle from which it is again lifted by the action of the blades.

3. A concrete mixer or agitator according to claim 1 wherein charging is effected through the aperture used also for discharging.

4. A concrete mixer or agitator as set forth in either of claims 1 or 2 wherein the downwardly inclined surface is constituted by a coned extension of the receptacle arranged with its axis substantially horizontal.

5. A concrete mixer or agitator as set forth in either of claims 1 or 2 wherein the blades interiorly of the receptacle and of said coned extension are adapted to effect the movement of the material being mixed away from said opening.

6. A concrete mixer or agitator according to either of claims 1 or 2 wherein the receptacle embodies a cylindrical portion merging into the sloped surface from which the material being mixed is returned by gravitation to said cylindrical portion in combination with a discharge opening associated with said cylindrical portion.

7. A concrete mixer or agitator comprising a cylindrical receptacle having a frustrated conical extension and arranged to rotate upon a horizontal axis, the larger end of said coned extension merging into said cylindrical portion and stirring means internally of said cylindrical portion and of said frustrated conical extension serving to move the material being mixed into said conical part after which said material is returned by gravity to the cylindrical portion, in combination with a discharge opening in the end wall of said cylindrical portion facing the coned extension.

8. A concrete mixer or agitator according to any of the preceding claims wherein the drum is rotated in one direction to cause the material under treatment to travel up said sloped or coned portion while rotation in the opposite direction enables the contents thereof to be discharged.

9. A concrete mixer or agitator as set forth in claims 1, 2, 5 or 7 wherein the stirring members are curved at the part thereof nearest the discharge opening to form a series of hollowed, bucket-like parts serving to lift the mixed materials when it is desired to discharge the mixed products and direct same to the discharge chute, in combination with filling means (50) at the rear of said bucket-like portions to prevent the accumulation of the material under treatment in the pockets otherwise formed.

10. A concrete mixer or agitator constructed and arranged substantially as herein described.

Dated this 4th day of October, 1930.

CHARLES FIELD BALL,

By Eric Potter,
Chartered Patent Agent,
London & Nottingham.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1931.